Framework for Registration, Classification, and evaluation of errors in the Forensic DNA Typing Process
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of ineffective and effective root cause analysis will be presented.
Attendees will learn the process of asking "why" five times to get
to the source of the non-conformance. In addition, participants will
learn why “blaming the individual” is missing the point of the root
cause process.

Forensic specific examples provided will include contamination in postmortem drug analysis cases after incomplete cleaning of a blender carafe and the Federal Bureau of Investigation (FBI) laboratory’s review of compositional bullet lead analyses
cases. These examples will demonstrate how a thorough root
cause analysis benefits the laboratory organization, the laboratory
employees, and the laboratory customers.

Root cause analysis is a skill that must be learned, a
process that requires continuous improvement, and a process that
will require resources. It’s too costly, some might say. Are you
willing to accept the risk of not doing root cause analysis well?

“\textit{A bad system will beat a good person every time.}” ~\textit{W. Edwards Deming}

\textbf{Root Cause Analysis, Continuous Improvement, Corrective Action}

\section*{W13 Framework for Registration, Classification, and Evaluation of Errors in the Forensic DNA Typing Process}

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The goals of this workshop are to encourage participants
to accurately and truthfully record and document quality issues in
their own forensic DNA laboratory and to teach attendees how to
deal with such issues in the context of a case. A proper way to
deal with errors is an essential tool to further improve on everyday
forensic practice.

This presentation will impact the forensic science
community by explaining how the precise magnitude of the error
rate in forensic DNA typing is difficult to estimate, with the principal
reason being the lack of a universally accepted definition of error in
the professional society of forensic DNA typing laboratories.

Although DNA analysis is considered one of the most
reliable forensic tools available today, errors can be made during the
course of the analysis. As this has a huge impact on the evidential
value of a DNA match, there is a growing interest for actual data
on the accuracy and error rates of forensic analyses and a more

In the report \textit{Strengthening Forensic Science in the United States: A Path Forward}, the National Academy of Sciences
refers to error rates as misidentifications: “proportions of cases
in which the analysis led to a false conclusion (as the percent of
incorrectly identified cases among all those analyzed).”\footnote{Error Rates, DNA, Laboratory Management}
The error rate includes both type 1 errors (wrongful reported match) and type
2 errors (wrongful reported exclusion). A major limitation of this
approach is that the majority of errors in the DNA typing process
do not lead to a misidentification. The consequence is that the
majority of errors and near failures in the typing process will not
be registered and will potentially stay undetected. The precise
magnitude of the error rate in forensic DNA typing is therefore
difficult to estimate, with the principal reason being the lack of a
universally accepted definition of error in the professional society
of forensic DNA typing laboratories. The Netherlands Forensic
Institute (NFI) has developed a comprehensive framework that
allows for the classification, registration, and evaluation of errors
in the forensic DNA typing process. In relation to the analysis
of biological samples, the NFI has defined “internal quality issue
notification” as \textit{any event} that can lead to a failure or diminished
quality of the analysis. These internal quality issue notifications
have been benchmarked and evaluated using actual workload data
from the department of Human Biological Traces of the NFI (over
400,000 DNA analyses) in the period 2008-2012.

This workshop will share data and the outcome of
evaluations with the forensic community.

After attending this workshop, attendees will understand:
1. when an “\textit{internal quality issue notification}” is made; (2) how an
   “\textit{internal quality issue notification}” is made; (3) how “quality issue
   notifications” are assessed and evaluated; (4) how this can be used
   for benchmarking and process improvement; (5) how quality issue
   notifications are graded by potential impact and actual impact; (6)
   when and how the judicial system is informed; (7) when and how
   the public is informed; and, (8) how to deal with error rates in the
   context of a specific case.

In the first part of this workshop, an outline of the web-
based NFI Quality On-Line Incident & Report Management system
and an explanation of the procedures that allow for reporting quality
issues in this system are given.\footnote{References: 1. W.C. Thompson, “\textit{Tarnish} on the ‘gold standard’: Understanding recent problems in forensic DNA testing.” The Champion, 30(1): 10-16 (January 2006). 2. www.qualityonline.com} These presentations include
details on the NFI work load, the data on the number of quality
issue notifications over the years 2008-2012, and procedures on
the assessment of quality issue notifications (necessary corrective
actions taken, identification of the root cause of the quality issue,
grading of notifications by potential impact, and actual impact).
Also, essential benchmarking data on the performance of forensic
DNA-typing in comparison with similar scientific disciplines (genetic
testing centers) is presented.

The second part of the workshop focuses on impact
analysis, explaining the framework that allows for an assessment
and evaluation of the consequences of quality issue notifications
for the conclusions of the DNA expert. Examples of errors with high
and low potential and actual impact on the case will be presented.

The final session of this workshop discusses how the
probability of an error affects the evidential value of a DNA match
in a case. Discussion will include different views on how the DNA
expert should incorporate the probability of an error in his or her
report and will explain how the NFI deals with this.

\textbf{References:}
2. www.qualityonline.com

\section*{W14 Postmortem Monocular Indirect Ophthalmoscopy}

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The goals of this presentation are to: (1) differentiate
between direct and indirect ophthalmoscopy, noting advantages
and limitations of each technique for the postmortem detection
of fundal hemorrhages; (2) discuss the fundal location of retinal
hemorrhages relative to their projected aerial image during
monocular indirect ophthalmoscopy; and, (3) on a fundal diagram,